

ELECTRONIC MAGAZINE SYSTEM

Field of the Invention

Embodiments of the present invention generally relate to device, systems, and methods for permitting a user to view the pages of a publication on a portable electronic screen. More particularly, the present invention relates to an electronic magazine system that provides the ability to view pages of a publication, such as a magazine, in a format that looks exactly the same as the conventional printed publication version of the magazine and to interact with portions of those pages.

Background of the Invention

A huge quantity of printed magazines, newspapers, and books are widely distributed in the traditional paper format. In addition to using lots of paper to manufacture these products, the distribution (i.e., shipping, transportation, and display) of books, magazines and newspapers consumes a lot of resources as well. The readers of many of these publications, such as newspapers and magazines, discard them shortly after the user is done reading them, thus adding to the burden of waste disposal.

With the increased growth and popularity of the Internet, many publishers have been turning to distributing their publications in alternate formats, such as in online format, and/or via media such as compact disk read only memories (CD-ROMS). With this technique, a reader can instead read the publication on the screen of his or her personal computer (PC). At the present time, however, despite the availability of such publications, consumers have not readily accepted reading from a computer screen. Most readers want to hold and cradle the item they are reading, view entire pages at once, and look down at their reading material. In addition, the page appearing on the screen frequently does not have the appearance, layout, or quality of the same page as it appears in the printed publication.

In response to the lukewarm response by consumers, makers of personal digital assistants (PDA) devices such as the Palm IV (available from Palm, Inc., 5470 Great America Parkway, Santa Clara, CA) and of electronic books (E-books) such as the

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Rocket eBook (available from NuvoMedia, Inc., 310 Villa Street, Mountain View, CA) have attempted to provide devices that more closely simulate the experience of reading an actual book. These devices are small and lightweight, like most books, magazines, and newspapers, but still do not provide the same experience as reading all of these types of publications. Because the screen size on the PDA's and Rocket eBooks is relatively small, it is difficult to put an entire page of a newspaper or magazine on the screen of either of these devices. In addition, neither device permits the reader to see the entire page exactly as it appears in the conventional published document. Also, these devices have low resolution and use proprietary software and or proprietary Internet-based language requirements.

Another disadvantage of such devices is that publications made available on such devices must be translated and recomposed for their screens and systems. The Rocket eBook, for example, calculates pages for each book depending on the font style, size and page orientation chosen. Because these factors make paging relative, the same book on different Rocket eBooks with different settings will have different page numbers. This feature, while acceptable for publications such as novels, is less satisfactory for publications having tables of contents, such as magazines and other periodicals. In addition, the page layout, colors, arrangement, illustrations, and even advertisements, form an integral part of the magazine's enjoyability and the convenience of the reading experience. These devices do not provide this type of experience during use.

One device that attempts to provide the experience of having the same format for reading books is called the EveryBook, manufactured by EveryBook, Inc., 2300 Vartan Way Harrisburg, PA. The EveryBook devices use existing print files from publishers and display them exactly as they would appear in print. One device offered by this manufacturer, called the EB Journal, offers full-page dual-screens, a color display, and provides storage for up to 200 fully illustrated reference books or 2,000 novels on each secure, removable storage card. To acquire content, users of the EveryBook devices communicate directly with the content provider.

Although the EB Journal enables users to read books in a format that approximates the way the book looks in print, it does not enhance the reader's experience

G O N E S I G H T - D E S I G N

by taking full advantage of the capabilities now offered by wireless and cellular technology or the interactive capabilities inherent in reading a document electronically.

Summary of the Invention

The present invention provides a "Digital Magazine" system that will closely simulate the experience of reading a printed magazine. In one embodiment, this system includes a portable, electronic, wireless device for "reading" the "digital magazine." The systems, methods, and devices of the present invention also enable users to access and acquire digital magazine (and other periodical) content via a data server in communication with publishers of the document, content providers, or a computer network such as the Internet. The electronic magazine system of the present invention enables consumers to have immediate access to a broad array of magazine publications using a device that replicates the form factor of a traditional paper magazine. The system of the present invention supports an increasingly mobile society and an infinite number of magazine publications, and gives consumers convenient, instant access to a wide selection of magazine content.

A system in accordance with one embodiment of the invention includes a portable, wireless reader device, a data server module, and a data converter module. The data converter module communicates with content providers, such as publishers, to receive document layouts (e.g., magazine layouts) that correspond to the actual print versions of the published document. The data converter module converts the received document layout information to an enhanced document having a predetermined format such as the portable document format (PDF). This format matches the format of the images and text as they appear on the magazine pages. The data server module communicates with the wireless reader device (via cellular or wireless communications means) to send that actual content (e.g., magazines), updates to content, and other requested information, to the wireless reader device. The user of the wireless reader device uses that device to read the magazine. The wireless reader device communicates with the data server module to receive content and send communications from the user and user information, including requests to purchase or subscribe to a particular periodical.

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In one embodiment, the wireless reader device comprises a computing device that uses two color liquid crystal display (LCD) screens to provide an electronic magazine system having the "look and feel" of a conventional magazines. The wireless reader device does not require a keyboard for the user to transmit information to the Data Server. Instead, software running on the wireless reader device displays onscreen buttons that permit the user to touch the buttons to send messages and communicate with the Data Server (e.g., send messages, select magazines to receive, "dog ear" a particular page being read, add a bookmark, tear out pages --virtually any action that the user can do with a conventional printed paper magazine). Figure 1 is an illustration of an actual wireless reader device implemented in accordance with an embodiment of the invention.

As will be described herein, the electronic magazine system of the invention provides additional enhancements for users that are not available or possible with the conventional printed magazine experience. For example, by touching predetermined parts of the displayed page, the user can indicate that he or she wants to receive additional information relating to some part of the page, wants specific information relating to the particular area he or she is touching, or that the user wants to purchase a product or service offered for sale (which is being touched) via the publication. For example, in one embodiment, a user can, using just the wireless reader device, easily and instantly place an order for any product or service advertised in the magazine by an advertiser capable of receiving electronic order from the data server module. Figure 2 is an illustration of this aspect of the invention.

The system of the invention allows the user to carry and read anywhere, 1000 pages (about five magazines) of content identical to that of printed magazines. In one embodiment, the electronic magazine system includes a hard wired local area network (LAN) link to allow rapid updating of content or access to archived back issues. In addition, the electronic magazine system provides wireless data transfer to enable real time e-commerce transactions in response to advertisements.

Other advantages of the present invention include:

- Real-time anytime anywhere broadband wireless communication.
- Legibility as good as paper magazine.

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- Browse (flip pages) and specific page access modes (info hierarchy)
- Open standard data format
- User's magazine experience is not diluted by extra functionality
- 'Rip out' functionality (the user can select pages to "rip out" of the magazine and save for themselves (e.g., print) or send to others.
- Short (effectively instant) page regeneration time.
- Closed box, so. no user access to operating system
- Uses LINUX, thus no operating system licensing issues.
- Battery life 1 hr minimum.

Details relating to this and other embodiments of the invention are described more fully herein.

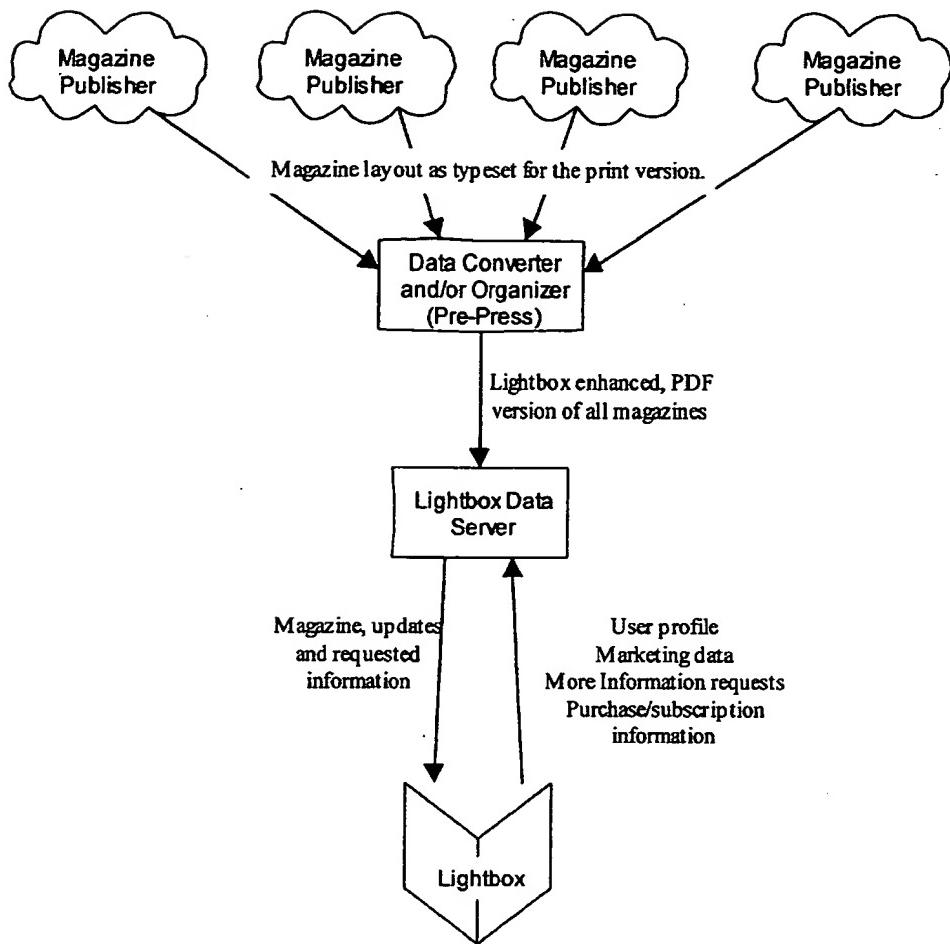
Detailed Description

As used herein, the Internet refers to the worldwide collection of networks and gateways that use the transmission control protocol/Internet protocol (TCP/IP) suite of protocols to communicate with one another. The World Wide Web (WWW) refers to the total set of inter-linked hypertext documents residing on hypertext transport protocol (HTTP) servers all around the world. As used herein, the WWW is also intended to refer to documents accessed on secure servers, such as HTTP servers (HTTPS), which provide for encryption and transmission through a secure port. WWW documents, referred to herein as web pages, can be written in hypertext markup language (HTML). As used herein, the term "web site" refers to one or more related HTML documents and associated files, scripts, and databases that is presented by an HTTP or HTTPS server on the WWW. The term "web browser" refers to software that lets a user view HTML documents and access files and software related to those documents.

The following diagram shows an electronic magazine system implemented in accordance with the invention. It should be understood that although the term "Lightbox" occasionally is used to describe the wireless reader device on which the magazine is read, that term is not intended to be viewed as limiting, but rather is provided for purposes of example only:

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In the above diagram, the "Magazine Publisher" represents the current publishers of print magazines, who typically supply their layouts in Quark or other well-known publishing program formats. The "Data Converter/Organizer" corresponds to the data conversion module. The Data Converter/Organizer is an entity that converts print typesetting to a digital picture format and adds the interaction elements to create the electronic magazine device enhanced version. In one embodiment of the invention, the Data Converter/Organizer also organizes information provided by the publisher and transmitted to the user (e.g., updates, subscription information, offers for new services and publications, and the like). The Data Converter/Organizer also can work with the Data Server to gather specific data relating to the reading of the magazines (e.g., advertisement responses and orders). This is discussed more fully herein.

The "Data Server" is a "central" repository of all magazines that allows the user to retrieve updates or replacement for damaged media. In addition, the Data Server is used to provide features, like article "page rip-out," a feature that permits users to get a copy of the article that looks exactly like the article looked when it appeared in the publication (as if the user had been able to rip it out of an actual magazine). The Data Server allocates a portion of storage space for each respective wireless reader device (Lightbox) to which it sends information. In addition, the Data Server stores an exact copy of each publication that has been ordered by and/or sent to one of the wireless reader devices (Lightbox). When the Data Server receives a request from a wireless reader device for a "rip out" of an article page, the Data Server transmits to the allocated storage space the portion of the stored publication corresponding to the stored page(s). The user can then use the wireless reader device to communicate with the Data Server to tell it what should be done with the "ripped out" page(s). For example, the page(s) could be sent to another user, such by electronically mailing it directly to the user, posted to a particular WWW site, printed, added to a library of stored articles, and the like.

The Lightbox of the above illustration is the wireless device reader. In the illustrated embodiment, the wireless device reader is the only interface with the content and data servers. It comprises an electronic device for displaying magazine content having two opposing surfaces joined by a hinge, such that the reader can look at two opposing "pages" in a manner similar to reading a magazine. The opposing surfaces could also be connected by other means capable of creating a "magazine-like" feel, such as a spiral edge, flexible brackets, and the like. To keep the device as small and "magazine like" as possible, the wireless device is light in weight, less than an inch thick, and has approximately a twelve-inch diagonal screen size, so as to closely replicate an actual magazine in size. This device is structured and arranged such that the reading experience feels the same as printed magazine, with exactly the same text and graphics appearing on the screen as appear in printed magazines.

In one embodiment of the invention, the wireless device reader provides the following functionality.

- Provides user interaction with enhanced magazine that it displays.

- Provides user interaction with the Data Server.
- Stores electronic magazines and user profile/preferences
- Converts magazine data from stored format to display format
- Communicates with Data Server as required
- Monitors user preferences and requests
- Manages power to the device (i.e., can tell the user the status of the battery)

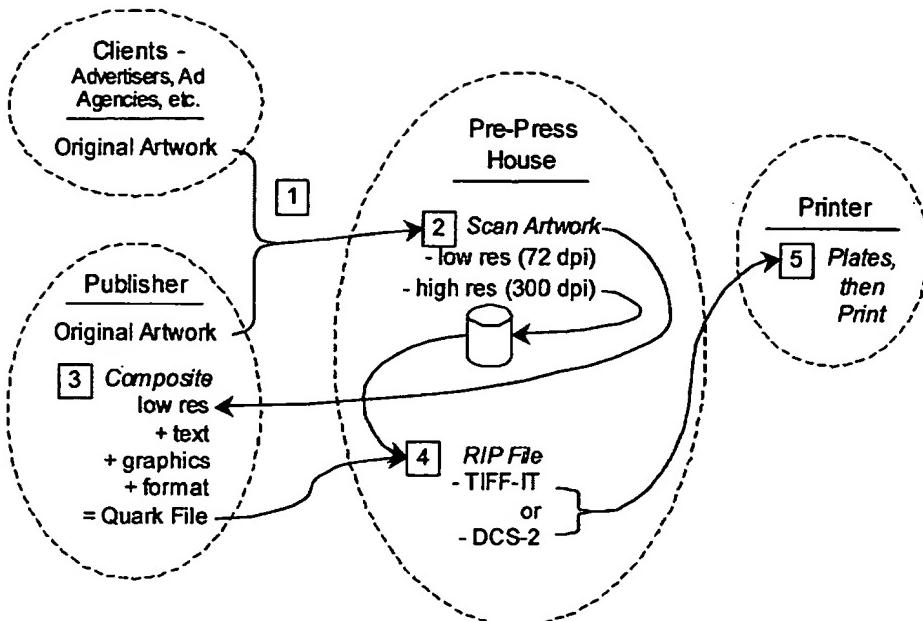
In addition, as described more fully herein, the electronic magazine system of the invention includes interactive features to enhance the experience of the reader, is capable of downloading information using wireless and/or cellular techniques, and is capable of storing up to one thousand pages (approximately five magazines). The electronic magazine system of the invention is suitable for travelers (both business and general), is capable of being used under many different lighting conditions, and is small enough to be stored in a briefcase.

Given the bandwidth constraints in delivering the magazine content directly to the wireless reader device from the data server, the present invention seeks to minimize the size of the size of the magazine file was a major concern. In one embodiment, the PDF data format is used because of the smaller data files that result and the superior text legibility. In other embodiments of the invention, however, other data transfer formats, such as JPEG/HTML with no zoom level or with two zoom levels, are usable with the invention.

As explained above, the Data Converter converts the magazine content into PDF files. As a comparison, the following diagram is an overview of the role of the pre-press house in current (conventional printed) magazine production.

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To be compatible with this process, the present invention can use several techniques for generating the PDF files.

In one embodiment, PDF is derived "live" with low resolution pictures by taking the Quark files directly from the publisher, then creating the PDF file from the Quark file. The advantage of this method is the Data Server need only deal with the publisher, but the disadvantage is that the pictures can sometimes have poorer quality than those created using other methods.

In another embodiment, prior to PDF generation, a high resolution picture is substituted for a low resolution picture by taking the Quark files directly from the publisher, taking a High Resolution picture from a Pre-Press system, substituting the high resolution picture for the low resolution picture ,then creating the PDF file. The advantage of this method is that the pictures will be of better quality than with the low resolution technique (in fact, this method will produce the best quality pictures), but the disadvantages are that more parties must be involved in the creation of the file and that the process will take longer.

In still another embodiment, prior to PDF generation, a Pre-Press system generates a medium resolution picture for use by the publisher prior to the publisher's creating the Quark file. Then, the Data Server takes the Quark file directly from the publisher and creates a PDF file from it. The advantage of this method is that the picture quality is better than the low-resolution method, but not as good as the high-resolution method. The disadvantages are that this method creates extra work for the Pre-Press system and that the "medium" level resolution can vary for different publications because of different sized pages.

In another aspect, the electronic magazine system of the invention goes beyond the available eBook and EveryBook products by providing users with the ability to interact with at least a portion of the content appearing in the electronic periodical being viewed. As explained previously, the electronic magazine system of this aspect provides a back-end infrastructure whereby at least a portion of the content in the periodical and transactions associated with the electronic magazine are routed through a centralized server. This routing also permits the user to seamlessly order products and/or services appearing in the magazine (whether appearing in advertisements or features).

In one embodiment, this is accomplished by the user's double touching (e.g., double clicking) the product or service of interest, which cause a information relating to the product or service for sale to appear on the screen of the wireless reading device (e.g., via a pop-up screen). The user selects what he or she wishes to order and touches the screen to at preselected locations on the image (e.g., an "order" button) to submit the order. Then, the wireless reading device sends the information to the Data Server. The Data Server receives the order from the user and sends the information to the seller so that the seller can fulfill the order. In one embodiment, the Data Server receives the order from the user and stores the order information so that it can later be transmitted to the seller. Figure 2 illustrates an embodiment of this feature of the invention.

In another embodiment, the Data Server can monitor information relating to orders placed using the wireless reader device (e.g., what seller the order corresponds to, what magazine the advertisement appeared in, how many orders resulted from particular advertisements, etc.) In that manner, the sellers and magazine publishers can learn how

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successful their advertisements are, enabling sellers to market more effectively and magazine publishers to more accurately price space in their magazines. This feature also can enable the magazine publishers to tailor the advertisements placed in a magazine selectively for specific subscribers, while still maintaining the rest of the magazine content exactly the same as the printed publication counterpart.

For example, the Data Server can track the ordering habits of subscribers to learn that a particular group of subscribers orders a lot of clothing from the magazines that they read but never orders cosmetics. The magazine publisher, when provided with this information, can provide to the Data Converter a "version" of the magazine that this group of subscribers gets having ads tailored to the buying habits of that group of subscribers. For example, instead of a full-page cosmetics advertisement that regularly appears on page 5 of the magazine, the publisher might instead substitute a different advertisement relating to clothing.

The above-described process can also work in the reverse. Because the wireless reader device is capable of transmitting information such as user profiles to the Data Server (along with marketing data, requests for information, requests to purchase and/or subscribe to magazines, etc.), a user can also tell the publisher directly the type of information in which the user is interested. For example, when ordering a subscription to a magazine, the user can indicate specific areas of interest, the Data Server can track and organize this information, and the information can be provided to the magazine publishers so that content (including, but not limited to, advertisements) can be adjusted accordingly.

The interaction described above is not limited, of course, to commerce transactions. In one embodiment, the invention permits the user to touch a portion of a displayed page to get more information about a particular topic that is displayed there, or to get information relating to related magazines and/or articles relating to the area touched. This additional information is stored at the Data Server, can be organized at the Data Converter/Organizer, and is linked to as desired by the user of the wireless reader device.

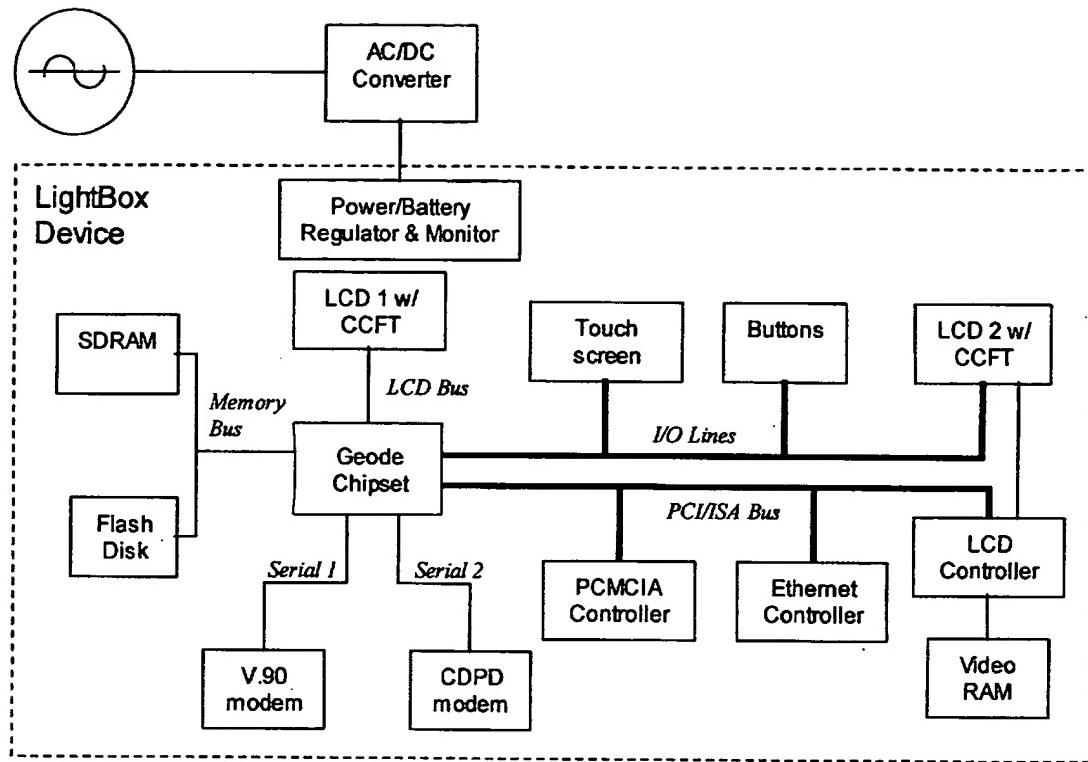
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The following provides a more detailed description of the wireless reader device, in accordance with one embodiment of the invention.

The wireless reader device may be implemented using an Intel x86/PC platform. However, because the wireless reader device is dedicated to a single function, in this embodiment only a subset of the PC platform is provided. For example, in this embodiment, the printer port, disk drive, interfaces, audio, mouse, and keyboard functions are not implemented. However, it should be understood that, as technological improvements enable these functions to be implemented in more compact and/or lightweight ways, any one or more of these features can be added to the wireless reader device.

The following is a block diagram of a wireless reader device, in accordance with one embodiment of the invention. Note that, although the diagram shows the wireless reader device coupled to an alternating current (AC) power source, the wireless reader device can be run off its batteries without connecting to AC.

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The display for the wireless reader device comprises at least one LCD flat panel display, to meet the requirements for small physical volume and low power. However, the invention is usable with any type of lightweight, low power display. At present, the available displays that are feasible for a briefcase sized device support a resolution of 1024 x 768 pixels, commonly known as XGA. With these displays, this is the resolution and aspect ratio that bitmap graphics are optimized for during the PDF generation process. For the best possible viewing angle and color fidelity, this embodiment of the invention uses active-matrix displays with backlighting. In another embodiment, given the presence of the touch screens, backlighting is increased. It also should be understood that as other types of technologies, such as plasma technologies, micro-mirrors, arrays of organic light emitting diodes (LEDs), and the like become smaller and less power consuming, screens implemented in accordance with these technologies can be usable in accordance with the invention, as well.

The interfaces between the wireless reader device and the Data Server comprise touch screens and/or ancillary buttons. In one embodiment of the invention, to ensure high resolution when touched by a finger, resistive touch screen technology is used. However, those skilled in the art will recognize that other types of touch screen technology, such as capacitive, near-field imaging, scanning infrared (IR), surface acoustic wave (SAW) and/or strain gauges can be used.

In one embodiment, the buttons perform functions related more to the wireless reader device itself than to the screens, so the buttons are used less often than the touch screen. The buttons can be discrete mechanical switches or membrane style switches, either snap-dome or conductive rubber. To keep the wireless reader device as thin and as low-cost as possible, the buttons can be made of conductive rubber.

The PDF data memory can be any type of memory having a good balance between low profile, low cost, and best capacity. For example, the PDF data memory can be any of the following types of memory: MiniDisc Data; Click; Superdisk; 80mm CD-ROM; Iomega Zip; ATOMlite; IBM Microdrive; MemoryStick; CompactFlash I, CompactFlash II, or ATA flash. Those skilled in the art will further recognize that other types and styles of data memory are usable in accordance with the invention.

The batteries can be any type of battery having a good balance between charge density versus weight and volume. For example, the batteries can be any of the following types: Lithium Polymer, Lithium-ion, or Nickel Metal Hydride.

The processor can be any type of processor having a good balance between low power, board space, cost, and Intel x86 compatibility, such as National Semiconductor's Geode family and the Crusoe family. Other possibilities for the processor include the Intel North & South Bridge or the Asilian Technologies LCD Controller.

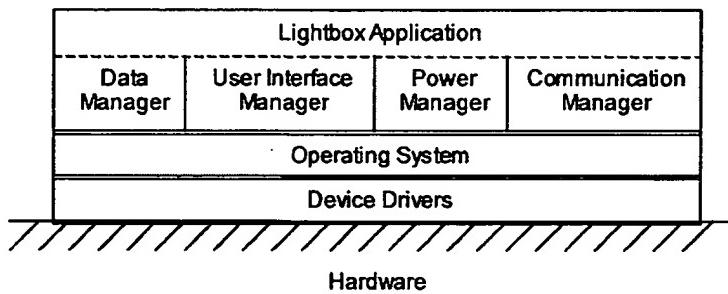
The case for the wireless reader device can be manufactured using any process known to those skilled in the art, such as Thixmolding, injection molding, sheetmetal processing, die casting, and the like.

Figure 3 is a visual representation of a wireless reader device 10 implemented in accordance with one embodiment of the invention. In Figure 3, the internal components of the wireless reader device 10 are visible for illustrative purposes only. As this figure

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illustrates, the batteries can be disposed in an array 20 along the "hinge" or "spine" portion of the wireless reader device 10. A pair of liquid crystal display (LCD) screens 30 are oriented on either side of the battery array 20. On the other end of the battery array 20 is a power socket 40. Each of the LCD screens 30 can be backlit. The wireless reader device 30 of this embodiment also includes a modem 50, which can be a conventional telephonic modem, a cable modem, a cellular modem, and the like.

The following diagram and set of descriptions illustrates the organization and structure of the software running on the wireless reader device, in accordance with one embodiment of the invention.



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Electronic magazine device Application – Proprietary software that executes the logic necessary to deliver the wireless reader device functions. At its core is the PDF Library licensed from Adobe.

Data Manager – Proprietary software to manage storage and access of electronic magazine system data.

User Interface Manager – Proprietary software that implements the desired user interaction.

Power Manager – Proprietary software to manage power from the battery/charger.

Communication Manager – Proprietary software to transfer data between the wireless reader device and the Data Server.

Operating System – Linux software to manage the wireless device reader device resources.

Device Drivers – COTS and proprietary software to interface with the wireless device reader hardware.

Although the wireless reader device has heretofore been described as a two-screen configuration, in another embodiment, the wireless reader device also is implemented as a tablet (single page).

As has been described herein, the electronic magazine system of the invention is implemented using a wireless reader device. Wireless communication is a very dynamic technology at the current time as manufacturers try to meet the demand for high-speed mobile data connections created by the availability of various Internet based services. There are two basic types of connections possible in accordance with the invention, local-area-networks (LAN) and wide-area-networks(WAN).

A wireless LAN is a wireless network that is attached to a proprietary network, which in turn accesses the Internet via a gateway of some sort. Coverage is limited to the geographic reach of the proprietary network. A standard has been approved for wireless LAN devices, IEEE 802.11, which specifies the protocols to be used as well as the frequencies to be used. This allows various makes of devices to inter-operate. The standard provides various modes of operation with data rates from 1Mbps to 11Mbps. Each 802.11 node can cover a 300-500ft-radius area. Another standard for wireless LAN devices, IEEE 802.3, also specifies protocols and frequencies. At least one embodiment of the present invention is intended to comply with both the IEEE 802.11 and IEEE 802.3 standards.

A wireless WAN is a wireless network that is attached to a common carrier network. Coverage is limited to the geographic reach of the common carrier network, but these networks tend to be national and international in scope.

In addition, a variety of digital wireless services are usable with the invention. These digital wireless services are available based on various infrastructures: cellular phone networks, paging networks, and proprietary networks.

The cellular phone networks can further be divided into three camps: North American technology, European/Asian technology, and proprietary technologies. The

North American technology is based on the AMPS (Advanced Mobile Phone services) standard developed by Bell Labs. Its services are detailed in a technology called Cellular Digital Packet Data (CDPD), which provides for data transfers up to 19.2kbps. Built on the latest cellular networks that use higher frequencies to create a digital network is a group of services called Personal Communication Services (PCS) that utilize the Code Division Multiple Access (CDMA) technology.

The European and Asian standard is called Global System for Mobile Communication (GSM) and includes data transmission up to 14.4kbps as part of the standard. For proprietary cellular technologies, Motorola has developed a technology called iDEN (integrated Dispatch Enhanced Network), provided by Nextel, that uses the lower frequencies assigned to cellular networks.

There two major types of paging networks: terrestrial or satellite based. Terrestrial networks use land-based antennas to transmit pages and receive responses. Typically these grew out of early mobile radio operations. Satellite based networks use satellites for the transmission of pages and terrestrial antennas to receive the responses. American Mobile operates a terrestrial network formed by the merger of two networks, RAM and ARDIS. National satellite network vendors include: Skytel and Research In Motion (RIMM).

There is a proprietary network called Ricochet that is being deployed in major metropolitan areas. It is based on the use of frequencies that do not require FCC licensing. The transceivers use spread-spectrum technology and are placed on power or light poles in a neighborhood. Current speed is about 28.8kbps.

Wireless LAN technologies will continue to improve and data rates will rise as wireless LANs seeks to replace wired LANs in many situations. The cost of running cables will rise since it is directly tied to the cost of labor. As the speeds increase, it is expected that the rated of data transmission associated with the invention can reach levels of 25Mbps.

A future application of the electronic magazine system of the invention may be in a new wireless LAN technology being developed called Bluetooth. This technology is targeted at smaller, personal networks. These networks typically operate at 1Mbps and

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only cover about a 10m radius area. The impact of Bluetooth will be in the constant connectivity of devices in a room. However, since the nodes are small and stationary, the impact on data transfers while the user is in transit will be minimal. While at a location, Bluetooth may be adequate for magazine updates. A competing standard with similar characteristics is also being developed called HomeRF.

For the electronic magazine system described herein, the wireless WAN improvements will have the greatest impact, with cellular likely to be the greatest contributor. A convergence between North American and global standards is expected. Japan is leading the way as a test bed for such 3G (third generation) technologies, which rely heavily on an evolving set of technologies called W-CDMA (wideband Code Division Multiple Access). By the year 2003, the data rate is expected to be about 2Mbps.

As the technologies converge, there will be a variety of intermediate technologies that utilize the then-existing infrastructure. These 2.5G technologies will offer intermediate data rates, 56/64kbps deploying now, and 384kbps deploying early 2002.

Paging and proprietary networks will also continue to evolve. For instance Ricochet has announced a 128kbps technology that it is planning to deploy over the next year. However it is unclear whether higher speeds are possible. For the paging and proprietary networks, various limits will likely restrict those networks to vertical markets.

As those skilled in the art will recognize, the invention described herein can be modified to accommodate and/or comply with any one or more of the above-described technologies and standards. In addition, variations, modifications, and other implementations of what is described herein can occur to those of ordinary skill in the art without departing from the spirit and the scope of the invention as claimed. Accordingly, the invention should not be limited by the preceding illustrative descriptions and drawings.

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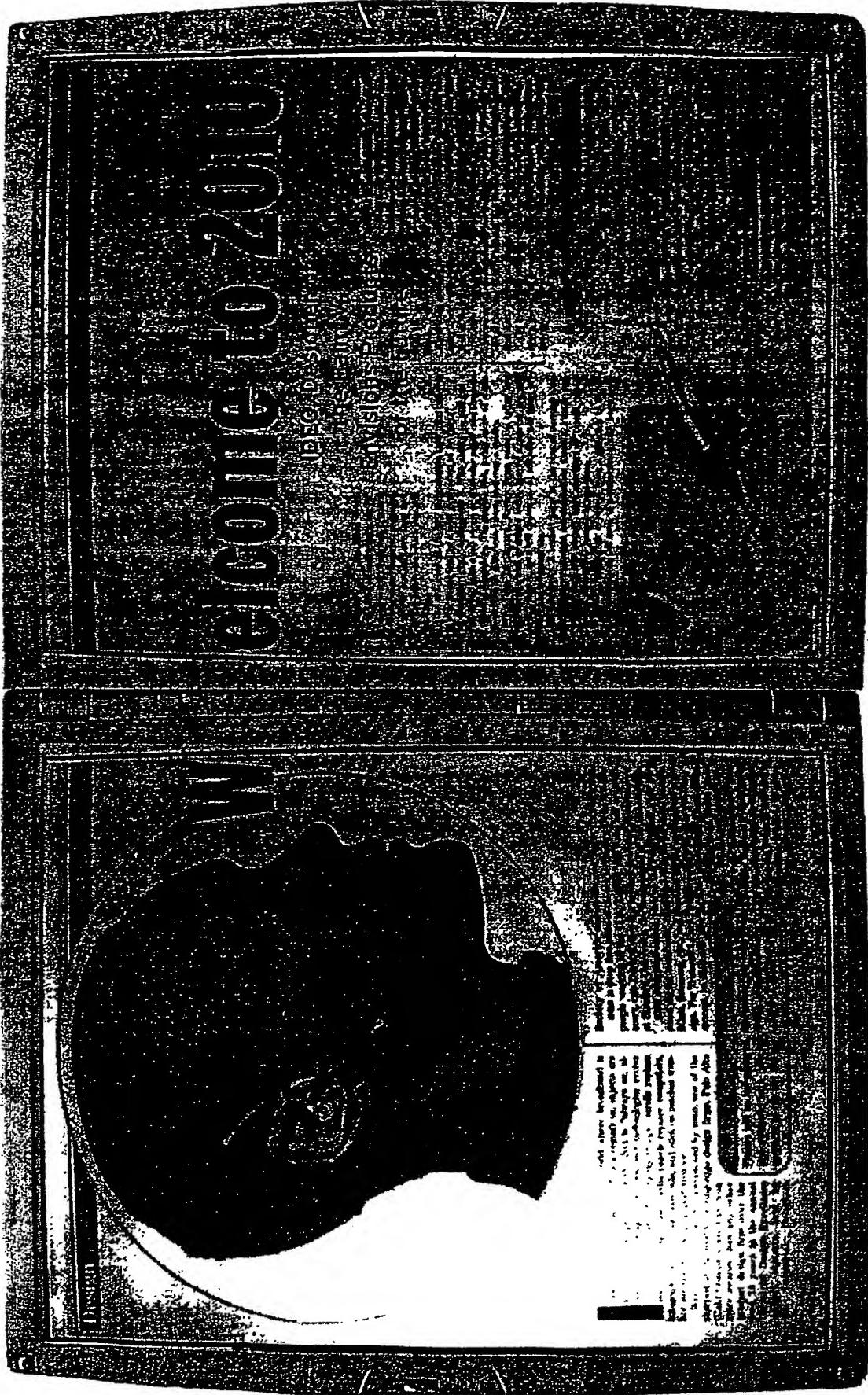


FIGURE 1

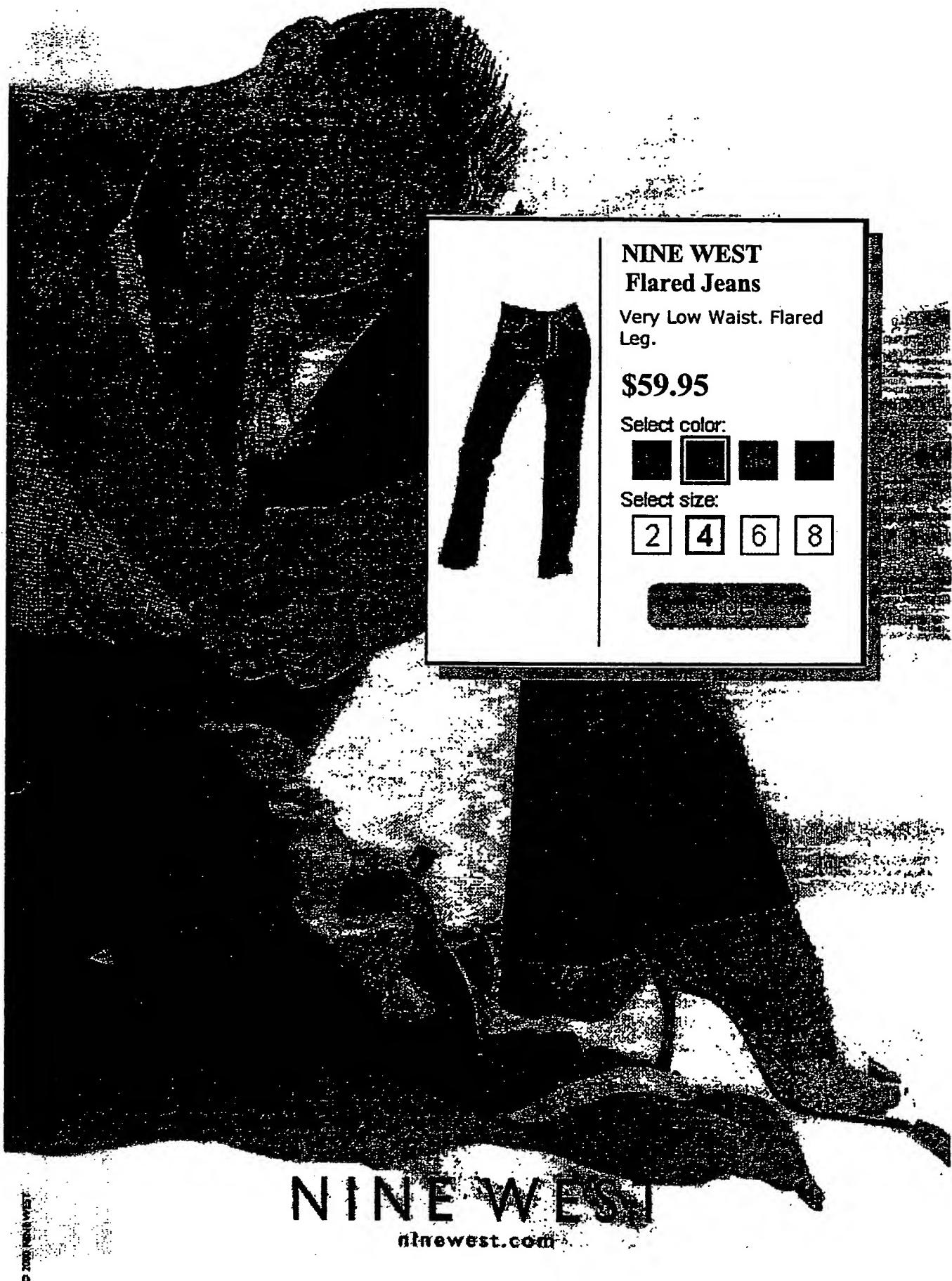


FIGURE 2.

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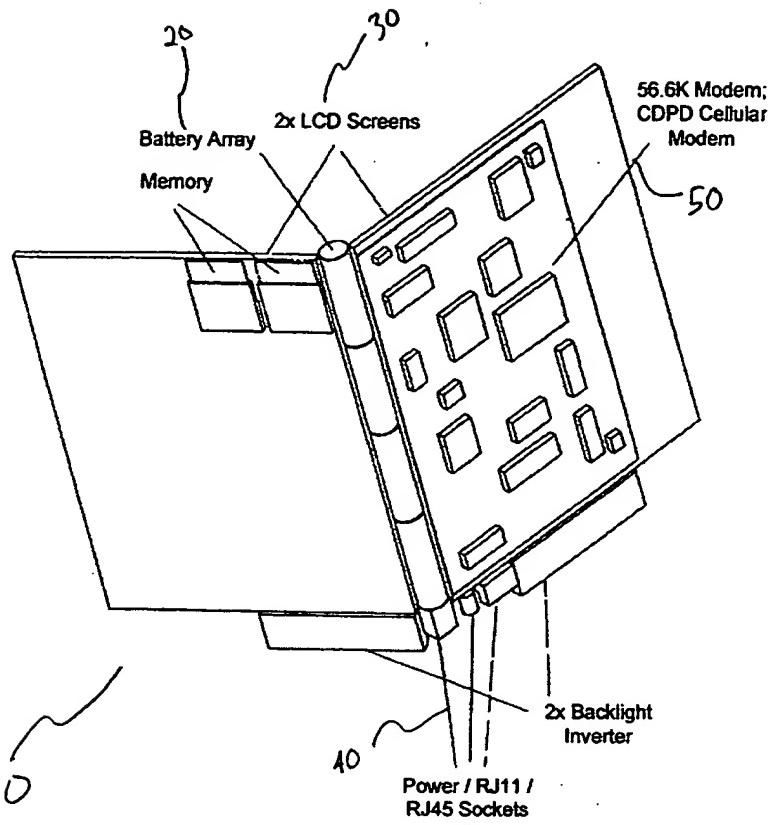


FIG. 3

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